

REMARKS

This Amendment is in response to the Office Action dated October 30, 2003 in which all pending claims 9-19 and 21-28 were rejected. With this Amendment, typographical errors in the Specification have been corrected and the claims remain unchanged. Applicant respectfully requests reconsideration and allowance of all pending claims.

In a response to the first Office Action filed on September 8, 2003, the Applicant cited portions of the Specification to support arguments made in the response. However, the pointed out sections of the Specification were incorrect due to a difference in pagination between a copy of the Specification used while preparing the response and the filed Application. The Applicant believes that these errors in the response to the first Office Action have influenced the claim rejections, and reasons supporting the claim rejections, in the final Office Action. Therefore, in the present Amendment, in addition to other arguments, the Applicant has included arguments made in the response to the first Office Action and the cited sections of the Specification with page and line numbers that properly correspond to portions of the filed Application.

I. REJECTION OF CLAIM UNDER 35 U.S.C. §112

On page 2 of the Office Action, the Examiner rejected claim 17 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.

Claim 17 depends from independent claim 9 and therefore includes all the limitations of claim 9. Thus, claim 17 includes "holding a first surface a known separation distance from a second . . . surface . . . ,," wherein "the first surface is a test surface of a rotating disc, and wherein a plurality of force measurements are performed between the test surface and the

second surface . . . , and wherein defects in the test surface are determined by comparing . . . the measured exerted force values."

In rejecting claim 17, the Examiner makes an assumption that if a separation distance between a test surface and a second surface is held constant while Casimir force measurements are carried out, with the second surface positioned over different regions of the test surface, the different Casimir force levels measured will have the same value. Based on this assumption, the Examiner concludes that it is not possible to determine defects in surfaces as claimed by claim 17, since claim 17 requires comparing different measured force values to determine defects in the test surface. However, the Applicant disagrees with the Examiner's assumption and conclusion because, in addition to being dependent upon the separation distance between the surfaces, the Casimir force exerted between surfaces depends upon the shape (or geometry) of the surfaces. (See page 4, lines 15-24 of the Specification). Thus, if the separation distance between the surfaces is maintained constant and the shape of at least one surface changes, the Casimir force exerted between the surfaces changes. This property is utilized by the present invention to determine defects in surfaces. (See page 4, lines 25-29 of the Specification).

On page 2 of the final Office Action, the Examiner states that "the Specification only gives support to the Casimir forces being dependent upon the area of only the smaller surface (Specification page 6 line 5)." (Emphasis Added). Based on this statement, and other similar statements, the Examiner concludes that the measured forces will only be related to changes in the distance from the (smaller) surface and not the shape of any surface.

Applicant respectfully asserts that the above-noted language of the Specification (page 6, line 5), pointed out by the Examiner, only relates to the Casimir force between

substantially flat surfaces of two parallel plates and does not apply, in general, to the Casimir force between two surfaces of any shape as suggested by the Examiner. Specifically, area A of the smallest plate is a parameter used only in Equation 1, on page 6 of the Specification, which is an example equation for the Casimir force exerted between surfaces of two substantially flat parallel plates. If the surfaces of the plate(s) are not substantially flat, Equation 1 does not apply. For example, a different relation (Equation 3 of the Specification (page 11, line 9)) applies for the Casimir force exerted between a substantially spherical surface and a substantially flat plate. Equation 3, and the description in connection with Equation 3, do not recite any dependency between the Casimir force value(s) and the area of the smaller surface. Thus, the Examiner's assertion that "the Specification only gives support to the Casimir forces being dependent upon the area of only the smaller surface" is incorrect.

As further evidence that the Specification gives support to the Casimir force being dependent upon the shape of the surfaces(s) for a particular separation distance, which is in contrast with the Examiner's conclusion noted above, Applicant has included the following language of the Specification (page 10, lines 1-10) below:

In a particularly useful embodiment, the method of FIG. 6-1 can be employed to determine defects in flat surfaces. The force between a flat surface and a reference surface with a known shape held at a first separation distance from the flat surface is measured to obtain a nominal force value. The flat surface is then replaced with a test surface whose flatness has to be determined. The test surface is held at the first separation distance from the reference surface. The force between the test surface and the reference surface is measured to obtain an exerted force value. The variation in flatness of the test surface from a flat

surface is indicated by the difference between the exerted force value and the nominal force value. (Emphasis Added).

For the above reasons, the rejection of claim 17 as failing to comply with the enablement requirement must be withdrawn.

II. CLAIM REJECTIONS UNDER 35 U.S.C. §103

On page 3 of the Office Action, claims 9-11, 14, 17, 18, 21, 22, 25 and 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Martin et al. (U.S. Patent No. 5,283,442) in view of Takahashi et al. (U.S. Patent No. 6,537,648). Further, claims 16, 19 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Martin et al. as modified by Takahashi et al. and applied to claim 9 above and further in view of Edwards et al. (U.S. Patent No. 6,094,971).

Claim 9 includes "holding the first surface a known separation distance from a second electrically conductive surface having a known shape." The Office Action states that Martin shows this limitation. Specifically, the Examiner states that bringing the probe tip within a preselected distance and then moving the probe tip so as to maintain the same force is considered equivalent to holding the first surface (probe tip) a known separation distance from a second surface (measured surface). As mentioned above, in Section I of the remarks, the dependency of the Casimir force upon shapes of surfaces is utilized by the present invention to determine defects in surfaces. Therefore, moving the probe tip so as to maintain the same force is not equivalent to the above-noted limitation of claim 9, since the separation distance has to be changed in order to maintain the same force when there are variations in the shape of the measured surface. Thus, Martin does not teach or suggest the above limitation of claim 9.

Claim 9 also includes "comparing the measured exerted force value to a nominal force value that would be expected to be exerted between the first and second surfaces as a result of the Casimir force if the shape of the first surface were equivalent to the nominal shape to obtain a difference between the measured exerted force value and the nominal force value." The teachings of Martin noted on page 4 of the Office Action only relate to controlling a probe tip at a constant distance from a surface and do not relate to "comparing the measured exerted force value to a nominal force value . . . between the first and second surfaces . . . if the shape of the first surface were equivalent to the nominal shape" as required by claim 9.

Additionally, the other references cited by the Examiner also do not teach or suggest the above limitations of claim 9. Furthermore, the Examiner provided no evidentiary basis for modifying the cited references to arrive at the present invention as claimed by claim 9. Thus, it is believed that independent claim 9 is patentably distinct and non-obvious over the cited prior art.

Independent claim 21 has elements similar to that of independent claim 9. Thus, for the same reasons as independent claim 9, Applicant submits that independent claim 21 is allowable. Moreover, Applicant respectfully submits that the dependent claims are also allowable by virtue of their dependency, either directly or indirectly from the allowable independent claims. Further, the dependent claims set forth numerous elements not shown or suggested in the cited references.


In view of the foregoing, Applicant respectfully requests reconsideration and allowance of claims 9-19 and 21-28. Favorable action upon all claims is solicited.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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